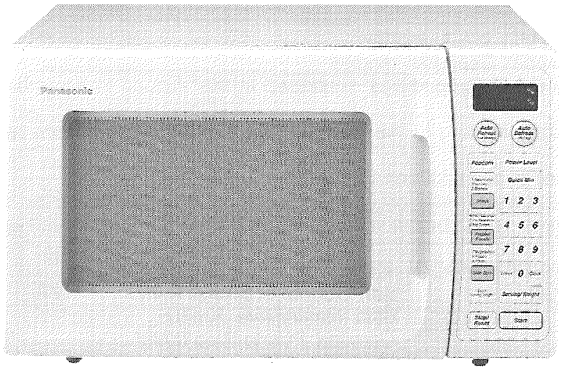
ORDER NO. MMCA9703026C1
E1

Service Manual

Microwave Oven



MODELS	APH
	USA
NN-S647BA	○
NN-S547BA	○
NN-S547WA	○

Specifications:

Models: / Specifications:	NN-S647BA	NN-S547BA NN-S547WA
Power Source:	120V AC Single Phase 60Hz	120V AC Single Phase 60Hz
Power Requirement:	1350W, (11.7A)	1350W, (11.7A)
Output: (IEC705-88)	850W	850W
Microwave Frequency:	2,450MHz	2,450MHz
Timer:	99 min. 99 sec.	99 min. 99 sec.
Cavity Size:	1.2 cu. ft.	1.0 cu. ft.
Oven Outside Dimensions: (H x W x D)	12" x 21 7/8" x 16 3/4" 306 mm x 555 mm x 425 mm	12" x 20" x 14 3/16" 306 mm x 510 mm x 360 mm
Cavity Inside Dimensions: (H x W x D)	8 5/8" x 14 3/4" x 15 9/16" 220mm x 375mm x 395mm	9" x 13 7/8" x 13 5/16" 229mm x 353mm x 338mm
Net Weight:	38 lbs. (17.2 kg.)	34 lbs. (15.3 kg.)
Output power: IEC705-88 Test procedure		
Oven specifications subject to change without notice		

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

WARNING

1. This product should be serviced only by trained qualified personnel.
2. Though this product has been manufactured in compliance with:
   "Federal Performance Standard 21 CFR Subchapter J" (D.H.H.S.): U.S.A. models
   or "Radiation Emitting Devices Act" (Health and Welfare Canada): Canadian models
   it is very important all repairs should be made in accordance with procedures described in this manual to avoid being exposed to excessive microwave radiation.
3. Check for radiation leakage before and after every servicing according to the "procedure for measuring radiation leakage".
4. If the unit cannot be repaired on site, advise the customer not to use until unit be repaired.
5. Any serviceman who learns of any accident pertaining to microwave radiation leakage including the oven operating with open door should immediately notify the appropriate address listed below and Center for Devices and Radiological Health, DHHS.

IN U.S.A. (PASC)	Panasonic Services Company 50 Meadowland Parkway, Secaucus, New Jersey 07094 Attention: Technical Service Division. (201) 348-7000	IN PUERTO RICO (PSC)	PSC San Gabriel Industrial Park 65th Infantry Ave. Km.9.5 Carolina, Puerto Rico 00985 (787)750-4300
		IN CANADA (PCI)	Panasonic Canada Inc. 5770 Ambler Drive, Mississauga, Ontario, L4W2T3 (905) 624-5010

6. There are special components used in the microwave oven which are important for safety. These parts are marked with a ⚠ on the replacement parts list. It is essential that these critical parts should be replaced only with the manufacturer's specified parts to prevent microwave leakage, shock, fire, or other hazards. Do not modify the original design.

PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

(A) Do not operate or allow the oven to be operated with the door open.
(B) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary:
   (1) Interlock operation
   (2) Proper door closing
   (3) Seal and sealing surfaces (arcing, wear, and other damage)
   (4) Damage to or loosening of hinges and latches.
   (5) Evidence of dropping or abuse
(C) Before turning on microwave power for any service test or inspection within the microwave generating compartments, check the magnetron, waveguide or transmission line, and cavity for proper alignment, integrity and connections.
(D) Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner.
(E) A microwave leakage check to verify compliance with the Federal Performance Standard should be performed on each oven prior to release to the owner.

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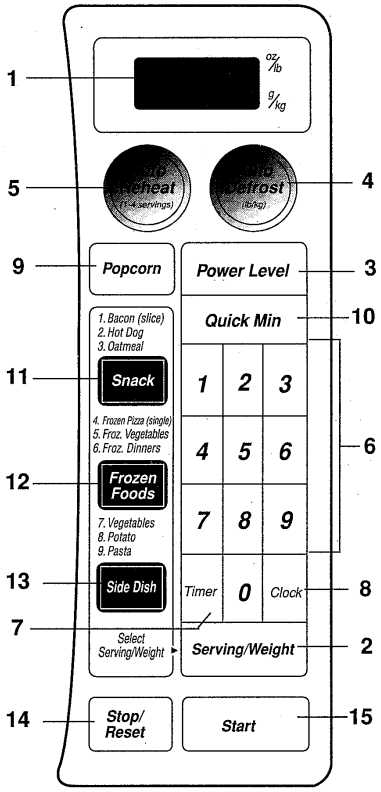
FEATURE CHART

FEATURES	USA Models
	NN-S647BA NN-S547BA NN-S547WA
Three Stage Cooking	○
Auto Cook	○
Auto Defrost	○
Auto Reheat	○
Auto Cooking Display #	○
Popcorn	○
Quick Minute	○
Child Safety Lock	○
Delay Start	○
Timer	○
Digital Clock	○

CONTROL PANEL

NN-S647BA
NN-S547BA/WA



1 Display Window
2 Serving Weight Pad
3 Power Level Pad
4 Auto Defrost Pad
5 Auto Reheat Pad
6 Number Pads
7 Timer Pad
8 Clock Pad
9 Popcorn Pad
10 Quick Minute Pad
11 Snack Pad
12 Frozen Foods Pad
13 Side Dish Pad
14 Stop/Reset Pad

Before cooking: One tap clears your instructions.
During cooking: One tap temporarily stops the cooking process. Another tap cancels all your instructions in the display window.

15 Start Pad

One tap allows oven to begin functioning. If door is opened or STOP/RESET Pad Pad is pressed once during oven operation, START Pad must again be pressed to restart oven.

OPERATION AND DIGITAL PROGRAMMER CIRCUIT TEST PROCEDURE

lb/kg Conversion: The oven automatically displays the lbs/oz symbol when using Auto Defrost feature etc. If you wish to use the kg/g, press Start Pad directly after plugging the oven in but before setting the clock.

1. To Set Clock

OPERATION	DISPLAY
1. Plug the power supply cord into wall outlet.	88.88
2. Press Clock pad.	✳
3. Enter time of day (TOD) by pressing appropriate Number pads.	11✳25
4. Press Clock pad. TOD has now been registered into the digital programmer circuit and will count up by minutes.	11.25

2. Time Cooking for Two Stage

OPERATION	DISPLAY
1. Place a water load in the oven.	
2. Press Power Level pad once to set High power. (1st stage)	P100
3. Set for 5 seconds by pressing Number pad.	. 5
4. Press Power Level pad 4 times to set Medium power. (2nd Stage)	P 50
5. Set for 1 minute by pressing Number pad.	1.00
6. Press Start pad. 1st stage cooking begins as time counts down.	✳ 5
7. When 1st stage cooking time has elapsed, oven beeps twice and automatically switches to 2nd stage cooking.	1✳00
8. When 2nd stage cooking time has elapsed, oven beeps 5 times and shuts off. Dot or TOD, if set, reappears on the display.	11.25

3. Auto Defrost

OPERATION	DISPLAY
1 . Press Auto Defrost pad.	A.dEF — ✳
2. Set the weight for 3 lb by pressing 3 and 0 pads.	3.0 —
3. Press Start pad. Auto Defrost cycle begins as time counts down. NN-S547BA/WA → NN-S647BA →	32✳00 27✳30
4. When defrost time has elapsed, oven beeps 5 times and shuts off. Dot or TOD, if set, reappears on the display.	11.25

4. Auto Reheat

OPERATION	DISPLAY
1. Press [Auto Reheat] pad twice for two servings.	2
2. Press [Start] pad. Auto Reheat cycle begins as time counts down. NN-S547BA/WA → NN-S647BA →	4:30 3:40
3. When cooking time has elapsed, Oven beeps 5 times and shuts off. Dot or TOD, if set, reappears on the display.	11.25

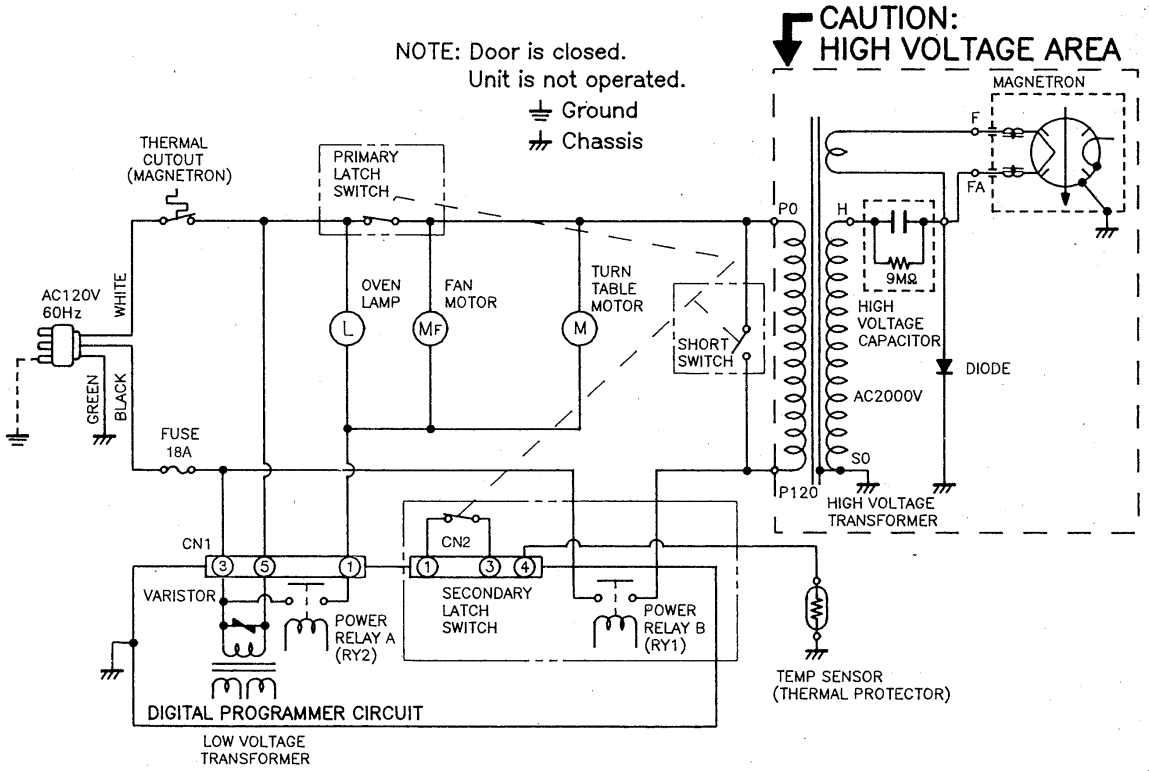
5. To Set Child Lock

OPERATION	DISPLAY
1. Press [Start] pad 3 times continuously, *Child* appears on the display. (You can set Child Lock when TOD is set or Dot is on the display.)	Child

6. To Reset Child Lock

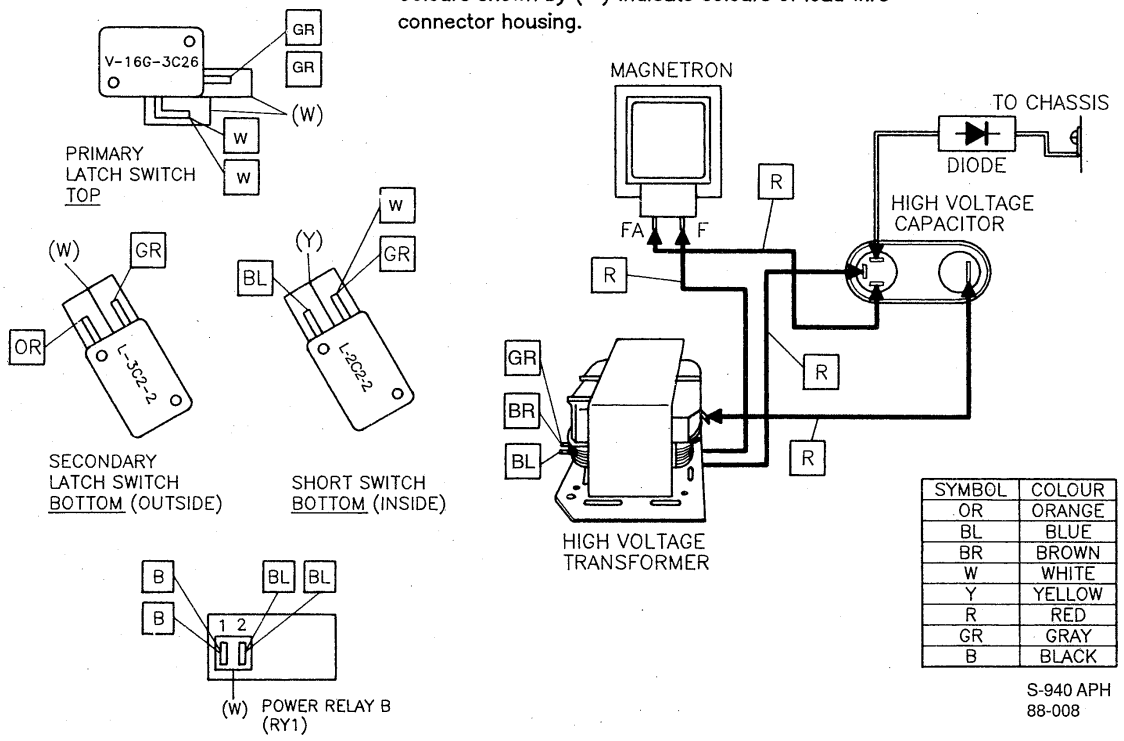
OPERATION	DISPLAY
1. Press [Stop/Reset] pad 3 times continuously. Dot or time of day, if set, appears on the display.	11.25

SCHEMATIC DIAGRAM (APH)



WIRING DIAGRAM

NOTE: *When replacing, check the lead wire colour as shown.
*Colours shown by ( ) indicate colours of lead wire connector housing.



SYMBOL	COLOUR
OR	ORANGE
BL	BLUE
BR	BROWN
W	WHITE
Y	YELLOW
R	RED
GR	GRAY
B	BLACK

S-940 APH
88-008

DESCRIPTION OF OPERATING SEQUENCE

1. Variable power cooking control

The coil of power relay B (RY1) is energized intermittently by the digital programmer circuit, when the oven is set at any power selection except for High power position. The digital programmer circuit controls the ON-OFF time of power relay B contacts in order to vary the output power of the microwave oven from "Low" to "High" power. One companies ON and OFF cycle of power relay B is 22 seconds. The relation between indications on the control panel and the output of the microwave oven is as shown in table

NOTE: The ON/OFF time ratio does not correspond with the percentage of microwave power since approximately 2 seconds are required for heating of magnetron filament.

POWER SETTING	OUTPUT POWER (%) APPROX.	ON-OFF TIME OF POWER RELAY B (RY1)	
		ON (SEC)	OFF (SEC)
HIGH	100%	22	0
MEDIUM-HIGH	70%	17	5
MEDIUM	55%	13	9
MEDIUM-LOW	30%	8	14
LOW	10%	5	17
DEFROST	30%	8	14

2. Auto Defrost, Auto Reheat, Auto Cook control

When these Auto Control features are selected and the Start Pad is tapped:

(A) The digital programmer circuit determines the power level and cooking time to complete cooking and indicates the operating state in the display window. Table shows the corresponding cooking times for respective serving by categories.

(B) When cooking time in the display window has elapsed, the oven turns off automatically by a control signal from the digital programmer circuit.

Auto Defrost

SELECTED WEIGHT	COOKING TIME	
	NN-S547BA NN-S547WA	NN-S647BA
1.0 LB	7 min.	7 min.
6.0 LB	66 min.	51 min.

Auto Reheat

SELECTED SERVING	COOKING TIME	
	NN-S547BA NN-S547WA	NN-S647BA
1	3 min.	2 min. 30 sec.
2	4 min. 30 sec.	3 min. 40 sec.
4	7 min.	5 min. 30 sec.

Auto Cooking

MENU	SERVING	COOKING TIME	
		NN-S547BA NN-S547WA	NN-S647BA
HOT DOG	3	2 min.	1 min. 30 sec.
POTATO	2	8 min. 40 sec.	7 min. 30 sec.
FROZ. PIZZA	8 oz	4 min. 30 sec.	5 min.
POPCORN	3.5 oz	3 min.	2 min. 20 sec.

CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is high-voltage, high-current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

CAUTION

Servicemen should remove their watches whenever working close to or replacing the magnetron.

1. Check the grounding

Do not operate on a 2-wire extension cord. The microwave oven is designed to be used when grounded. It is imperative, therefore, to make sure it is grounded properly before beginning repair work.

2. Warning about the electric charge in the high voltage capacitor

For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitor.
When replacing or checking parts, remove the power plug from the outlet and short the terminal of the high voltage capacitor (terminal of lead wire from diode) to chassis ground with an insulated handle screwdriver to discharge.

WARNING

There is high-voltage present, with high-current capabilities in the circuits of the high voltage winding and filament winding of the high voltage transformer. It is extremely dangerous to work on or near these circuits with oven energized.
DO NOT measure the voltage in the high voltage circuit including filament voltage of magnetron.

WARNING

Never touch any circuit wiring with your hand nor with an insulated tool during operation.

3. When parts must be replaced, remove the power plug from the outlet.

4. When the 18 Amp fuse is blown due to the operation of short switch:

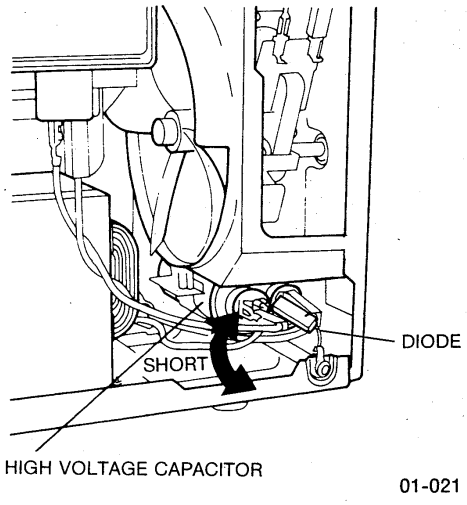
WARNING

When the 18 Amp. fuse is blown due to the operation of short switch, you must replace Primary latch switch and short switch. Also replace power relay B (RY1) when the continuity check reads shorted contacts (1-2).

(A) This is mandatory. Refer to "Adjustments and Measurement" for these switches.
(B) When replacing the fuse, confirm that it has the appropriate rating for these models.
(C) When replacing faulty switches, be sure mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.

5. Avoid inserting nails, wire, etc. through any holes in the unit during operation.

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any other holes or gaps, because such objects may work as an antenna and cause microwave leakage.



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Touch chassis side first then short to the high voltage capacitor terminal.

6. Confirm after repair

(A) After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loose nor missing.
Microwaves might leak if screws are not properly tightened.
(B) Make sure that all electrical connections are tight before inserting the plug into the wall outlet.
(C) Check for microwave energy leakage. (Refer to procedure for measuring microwave energy leakage.)

CAUTION

MICROWAVE RADIATION

DO NOT BECOME EXPOSED TO RADIATION FROM THE MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

IMPORTANT NOTICE

1. The following components have potentials above 250V while the appliance is operated.
   - ❋ Magnetron
   - ❋ High voltage transformer
   - ❋ High voltage diode
   - ❋ High voltage capacitor

   Pay special attention on these portions.
2. When the appliance is operated with the door hinge or magnetron fixed incorrectly, the microwave leakage can reach more than 5mW/cm^3. After repair or exchange, it is very important to check if magnetron and the door hinge is correctly fixed.

DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

1. Magnetron

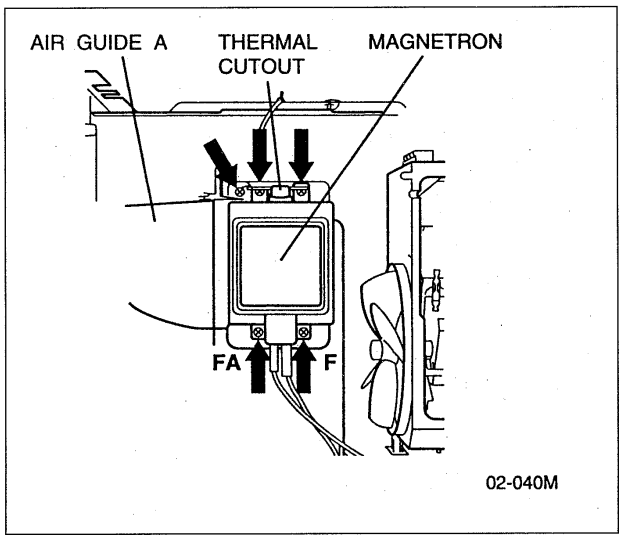
(A) Discharge the high voltage capacitor.
(B) Remove 2 screws holding magnetron thermal cutout.
(C) Remove 1 screw holding air guide A.
(D) Disconnect 2 high voltage lead wires from magnetron filament terminals.
(E) Remove 4 screws holding the magnetron.
NOTE: After replacement of the magnetron, tighten mounting screws properly making sure there is no gap between the waveguide and the magnetron to prevent microwave leakage.

CAUTION

When replacing the magnetron, be sure the antenna gasket is in place.

CAUTION

When connecting 2 filament lead wires to the magnetron terminals, be sure to connect the lead wires in the correct position. The lead wire of high voltage transformer should be connected to "F terminal" and the lead wire from high voltage capacitor should be connected to "FA terminal".



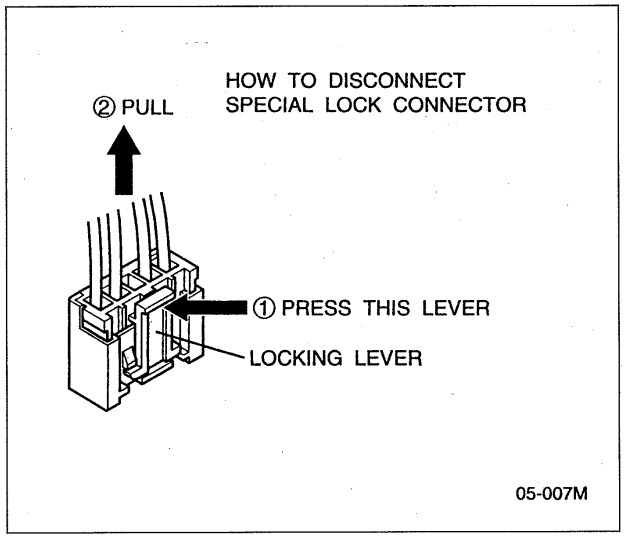
2. Digital Programmer Circuit (DPC) and membrane key board.

NOTE: Be sure to ground any static electric charge built up on your body before handling the DPC.
(A) Disconnect all connectors from D.P.C.
(B) Remove 2 screw holding escutcheon base and slide the escutcheon base upward slightly.
(C) Release flat cable connector's lock of DPC by pushing both levers to inside and pull them upward, and remove flat cable of membrane key board.
(D) Remove 2 screws holding DPC.

To replace membrane key board

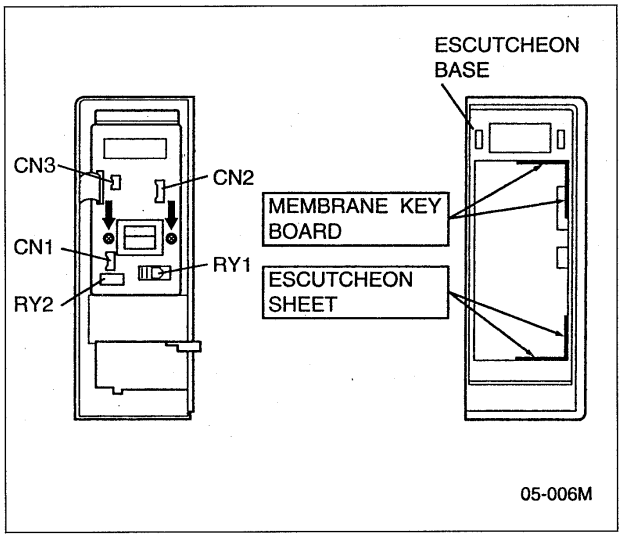
(E) Remove escutcheon bracket from escutcheon base by freeing 4 catch hooks on the escutcheon base.
(F) Push the upper part of key board (display window portion) from back of escutcheon base and peel off escutcheon sheet and membrane key board completely from escutcheon base.

NOTE: 1. The membrane key board is attached to the escutcheon base with double faced adhesive tape. Therefore, applying hot air such as using a hair dryer is recommended for smoother removal.
2. When installing new membrane key board, make sure that the surface of escutcheon base is cleaned sufficiently so that any problems (shorted contacts or uneven surface) can be avoided.
3. Alignment position of membrane key board is as follows (see figure);
Membrane key board: Right and upper edges
Escutcheon sheet: Right and lower edges



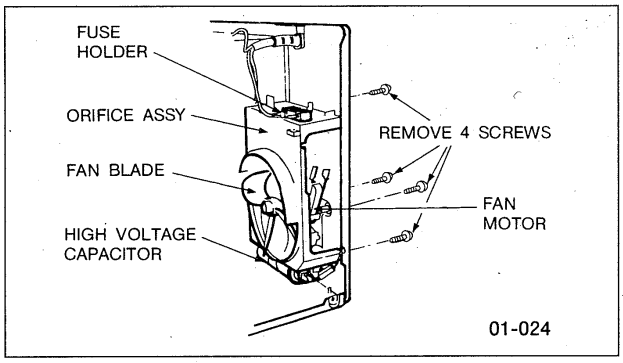
3. Low voltage transformer and/or power relays (RY1, RY2)

NOTE: Be sure to ground any static electric charge built up on your body before handling the DPC.
(A) Using solder wick or a desoldering tool and 30W soldering iron, carefully remove all solder from the terminal pins of the low voltage transformer and/or power relays.
NOTE: Do not use a soldering iron or desoldering tool of more than 30 watts on DPC contacts.
(B) With all the terminal pins cleaned and seperated from DPC contacts, remove the defective transformer/power relays and install new transformer/power relays making sure all terminal pins are inserted completely. Resolder all terminal contacts carefully.



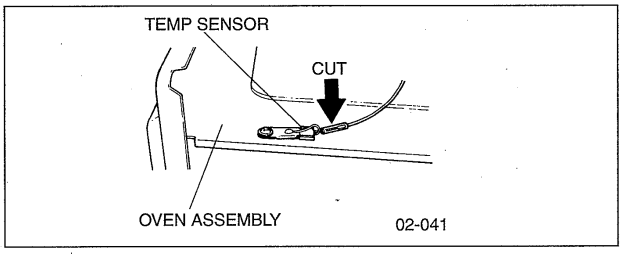
4. Fan motor

(A) Disconnect 2 lead wires from fan motor terminals.
(B) Disconnect 2 lead wires from fuse holder terminals.
(C) Disconnect 4 high voltage lead wires from high voltage capacitor terminals.
(D) Remove 4 screws holding fan motor and orifice assy and detach the orifice assy with fan motor from oven assy.
(E) Remove fan blade from the fan motor shaft by pulling it straight out.
(F) Separate the fan motor from the orifice assy by freeing 2 catch hooks on the orifice assy.



5. Temp sensor (thermal protector)

(A) Cut a lead wire at the top of sensor terminals.
(B) Remove 1 screw holding the temp sensor and replace with new one.
(C) Solder the lead wires securely to the sensor terminals.

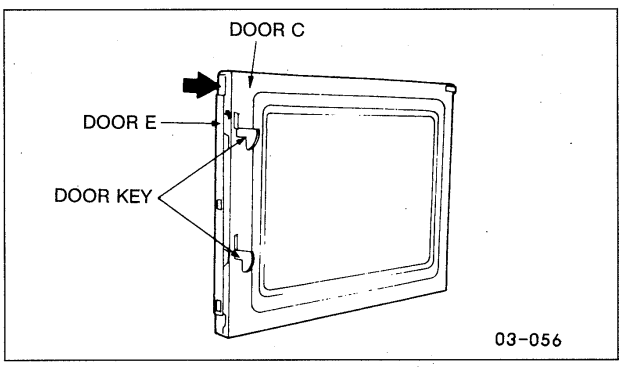


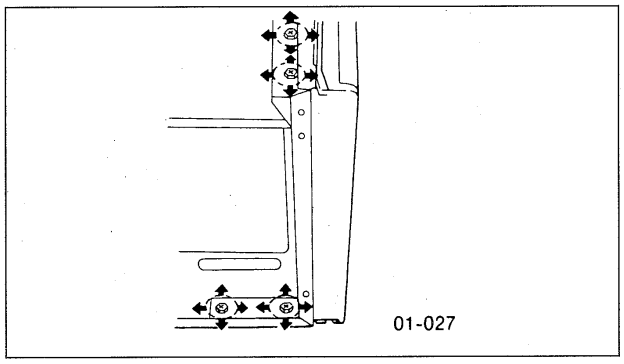
6. Door assembly

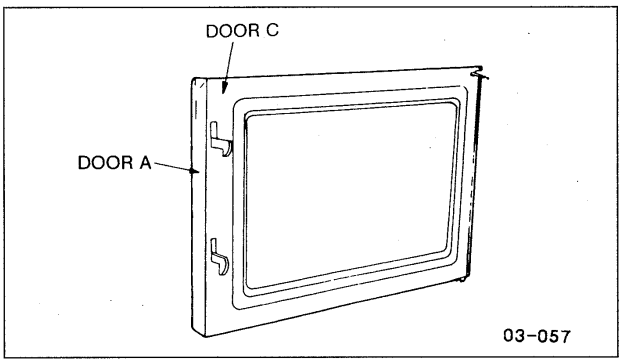
(A) Separate door C by freeing catch hooks using a flat blade screwdriver.
(B) Open the door and remove 2 screws holding door E to door A.
(C) Separate door A by freeing catch hooks.
(D) Remove door key and door key spring.

After replacment of the defective component parts of the door, reassembie it and follow the instructions below for proper installation and adjustment so as to prevent an excessive microwave leakage.

(1) When mounting the door to the oven, be sure to adjust the door parallel to the bottom line of the oven face plate by moving the upper hinge and lower hinge in the direction necessary for proper alignment.
(2) Adjust so that the door has no play between the inner door surface and oven front surface. If the door assembly is not mounted properly, microwave power may leak from the clearance between the door and oven.
(3) Perform the microwave leakage test.







7. Turntable motor

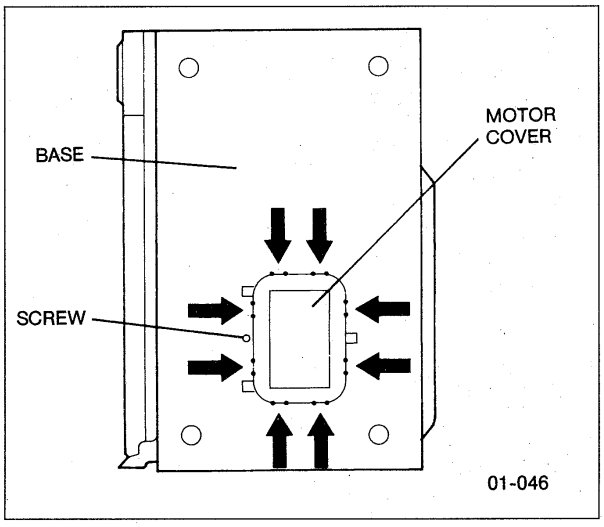
(A) Remove the motor cover by breaking off at the 8 spots indicated by arrows with a cutter or the like. (See Figure)

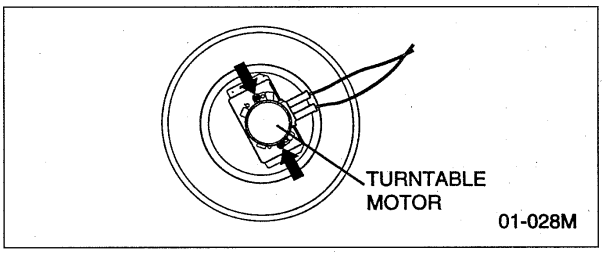
NOTE: After breaking off the motor cover, make sure that cut-off portions are properly trimmed off or bend to inside so that no sharp edge will expose to outside.

(B) Disconnect 2 lead wires connected to the turntable motor.

(C) Remove the turntable motor by removing 2 screws.

NOTE: To reinstall the motor cover, use 4X6 screw.





COMPONENT TEST PROCEDURE

CAUTION

1. High voltage is present at the high voltage terminal of the high voltage transformer during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitor.

1. Primary Latch Switch, Secondary (Secondary Latch Switch and Power Relay B) Interlocks.

(A) Unplug the lead connectors to Power Relay B and verify continuity of the power relay B 1-2 terminals.
(B) Unplug lead connectors to Primary Latch Switch and Secondary Latch Switch.
(C) Test the continuity of switches at door opened and closed positions with ohm meter (low scale).
Normal continuity readings should be as follows.

	Door Opened	Door Closed
Primary Latch Switch	∞ Ω (open)	0 Ω (close)
Secondary Latch Switch	∞ Ω (open)	0 Ω (close)
Power Relay B	∞ Ω (open)	∞ Ω (open)

2. Short Switch & Monitor

(A) Unplug lead wires from H.V. transformer primary terminals.
(B) Connect test probes of ohm meter to the disconnected leads which were connected to H.V. Transformer.
(C) Test the continuity of short switch with door opened and closed positions using lowest scale of the ohm meter.
Normal continuity readings should be as follows.

Door Opened	Door Closed
0 Ω	∞ Ω

3. High voltage transformer

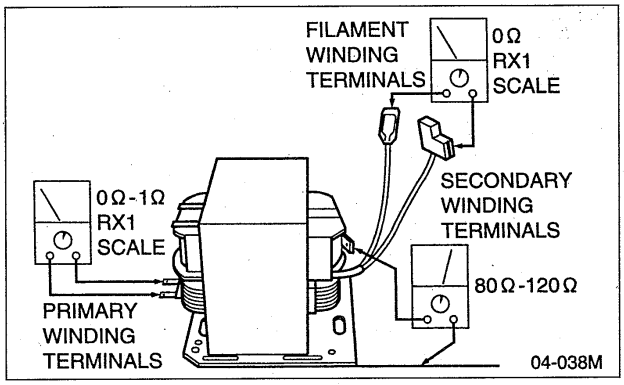
(A) Remove connectors from the transformer terminals and check continuity.
(B) Normal (cold) resistance readings should be as follows:
Secondary winding . . . . . Approx. 80Ω~120Ω
Filament winding . . . . . Approx. 0Ω
Primary winding . . . . . Approx. 0Ω~1Ω

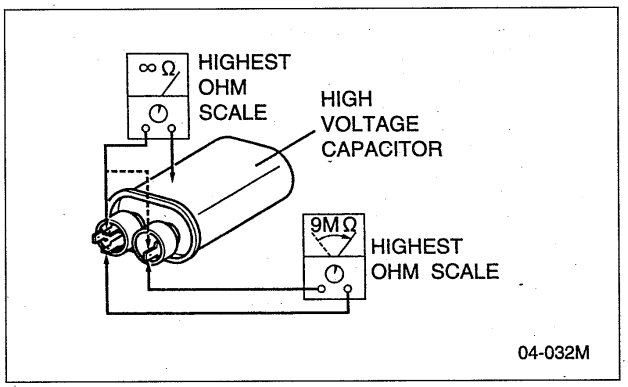
4. High voltage capacitor

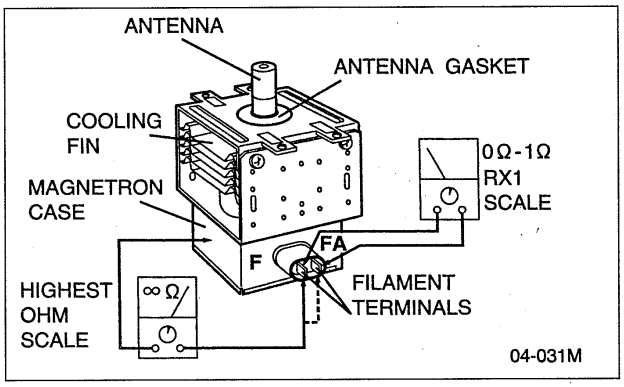
(A) Check continuity of capacitor with meter on highest OHM scale.
(B) A normal capacitor will show continuity for a short time, and then indicate 9MΩ once the capacitor is charged.
(C) A shorted capacitor will show continuous continuity.
(D) An open capacitor will show constant 9MΩ.
(E) Resistance between each terminal and chassis should be infinite.

5. Magnetron

Continuity checks can only indicate an open filament or a shorted magnetron. To diagnosis for an open filament or shorted magnetron.
(A) Isolate magnetron from the circuit by disconnecting the leads.
(B) A continuity check across magnetron filament terminals should indicate one ohm or less.
(C) A continuity check between each filament terminal and magnetron case should read open.



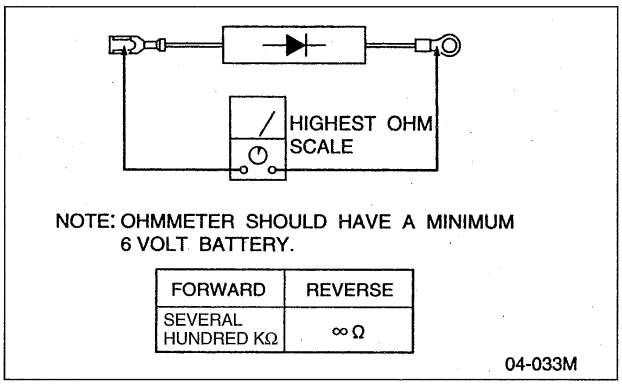




6. Diode

(A) Isolate the diode from the circuit by disconnecting the leads.

(B) With the ohmmeter set on the highest resistance scale, measure the resistance across the diode terminals. Reverse the meter leads and again observe the resistance reading. Meter with 6V, 9V or higher voltage batteries should be used to check the front-to-back resistance of the diode, otherwise an infinite resistance may be read in both directions.
A normal diode's resistance will be infinite in one direction and several hundred KΩ in the other direction.

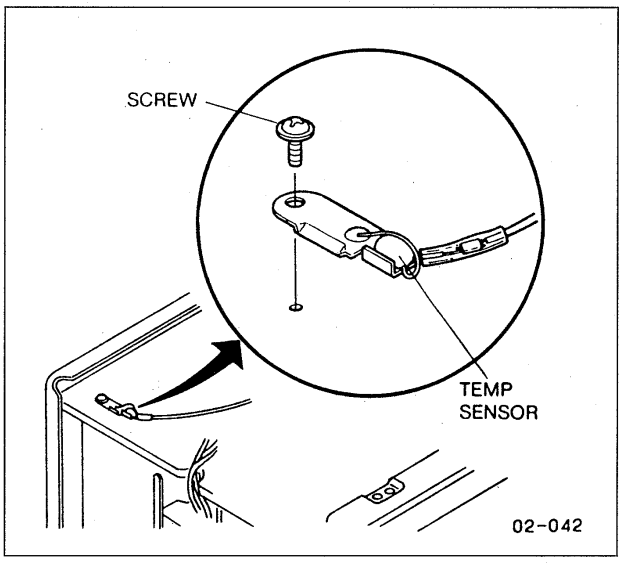


7. Membrane key board (Membrane switch assembly)

Check continuity between switch terminals, by tapping an appropriate pad on the key board. The contacts assignment of the respective pads on the key board is as shown in digital programmer circuit.

8. Temp sensor (Thermal protector)

A temp sensor is mounted on top of the oven cavity at the left side. Its purpose is to automatically shut off the oven in case the cavity overheats for any reason.
The thermal protector will operate at 257°F (125°C).
The device is connected to the DPC on touch control models. When the thermal protector exceeds its temperature it will turn off the power to oven cavity and display will go to reset mode.
The cooking program can be reset after cool-down.
THERMISTOR RESISTANCE VALUE
30K-120K at 10°C-30°C (50°F-86°F)



MEASUREMENTS AND ADJUSTMENTS

WARNING

* For continued protection against radiation hazard, replace only with identical replacement parts (For touch models Part No. ANE6142-1450 Type No. V-16G-3C26-M for Primary latch switch Part No. A61425180AP, Type No. L-3C2-2 for Secondary latch switch and Part No. A61785180AP, Type No. L-2C2-2 for short switch)
* When the 18 Amp. fuse is blown due to the operation of short switch, you must replace Primary latch switch and short switch. Also replace power relay B (Part. No. AEG5J1EG12B/AEG5J1EG18B, Type No. G5J-1-TP) when the continuity check reads shorted contacts (1—2). Then follow the adjustment procedures below.
* Interlock switch replacement — In replacing faulty switches, be sure mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.
* Refer to schematic diagram to ensure proper connection.

1. Adjustment of Primary latch switch, Secondary latch switch and Short switch.

(A) When mounting Primary latch switch, Secondary latch switch and short switch to door hook assembly, mount the Primary latch switch, the Secondary latch switch and the short switch to the door hook assembly as shown in table.

NOTE: **No specific adjustment during installation of Primary latch switch, Secondary latch switch and short switch to the door hook is necessary.**

(B) When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of arrow in table so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook assembly to the oven assembly.

(C) Reconnect the short switch and check the continuity of the monitor circuit and all latch switches again by following the components test procedures.

2. Measurement of microwave output

The output power of the magnetron can be determined by performing IEC standard test procedures. However, due to the complexity of IEC test procedures, it is recommended to test the magnetron using the simple method outlined below.

Necessary Equipment:

*1 liter beaker *Glass thermometer

*Wrist watch or stopwatch

NOTE: **Check the line voltage under load. Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurate as possible.**

(A) Fill the beaker with exactly one liter of tap water. Stir the water using the thermometer and record the beaker's temperature (recorded as T1).

(B) Place the beaker on the center of glass cook plate.
Set the oven for High power and heat it for exactly one minute.

(C) Stir the water again and read the temperature of the beaker (recorded as T2).

(D) The normal temperature rise at High power position for each model is as shown in table.

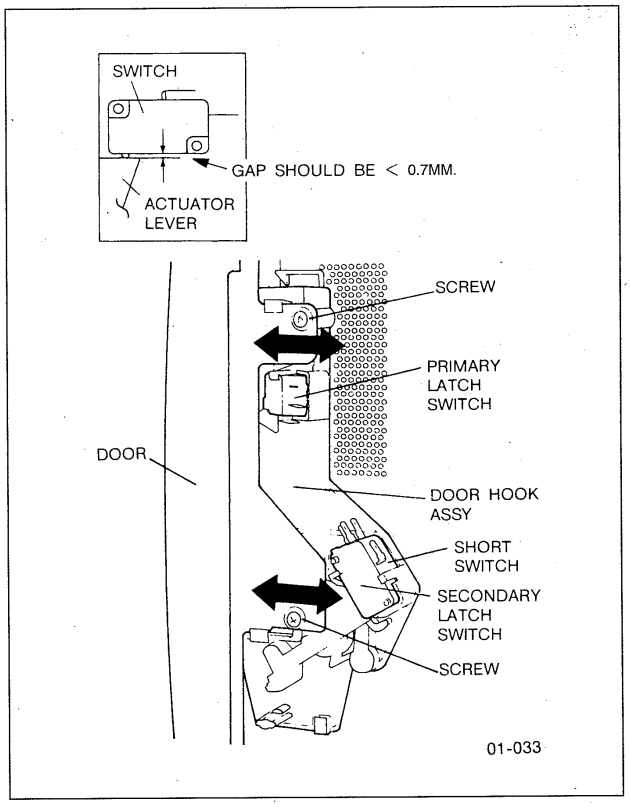


TABLE (1ℓ-1min. test)

RATED OUTPUT	TEMPERATURE RISE
850W (IEC705-88)	Min. 13.1°F (7.5°C)

PROCEDURE FOR MEASURING MICROWAVE ENERGY LEAKAGE

WARNING

Check for radiation leakage after every servicing. Should the leakage be more than 2 mW/cm² (1mW/cm² for Canada) inform PASC, PSC, or PCI immediately. After repairing or replacing any radiation safety device, keep a written record for future reference, as required by D.H.H.S. and Health and Welfare Canada regulation. This requirement must be strictly observed. In addition, the leakage reading must be recorded on the service repair ticket while in the customer's home.

NOTE: **The U.S. Government standard is 5 mW/cm² while in the customer's home. 2 mW/cm² stated here is our own voluntary standard. (1 mW/cm² for Canada)**

1. Equipment

*Electromagnetic radiation monitor
*Glass thermometer 212°F or 100°C
*600cc glass beaker

2. Procedure for measuring radiation leakage.

Note before measuring.

(1) Do not exceed meter full scale deflection. Leakage monitor should initially be set to the highest scale.

(2) To prevent false readings the test probe should be held by the grip portion of the handle only and moved along the shaded area shown in Figure no faster than 1 inch/sec (2.5 cm/sec).

(3) Leakage with the outer panel removed ..... less than 5mW/cm².

(4) Leakage for a fully assembled oven with door normally closed..... less than 2mW/cm² (1mW/cm² for Canada).

(5) Leakage for a fully assembled oven [Before the latch switch (primary) is interrupted] while pulling the door..... less than 2mW/cm².

(A) Pour 275 ± 15cc (9ozs ± 1/2oz) of 20 ±5°C (68 ± 9°F) water in a beaker which is graduated to 600cc, and place in the center of the oven.

(B) Set the radiation monitor to 2450MHz and use it following the manufacturer's recommended test procedure to assure correct results.

(C) When measuring the leakage, always use the 2 inch (5cm) spacer supplied with the probe.

(D) Tap the start pad or set the timer and with the magnetron oscillating, measure the leakage by holding the probe perpendicular to the surface being measured.

(1) Measurement with the outer panel removed.

Whenever you replace the magnetron, measure for radiation leakage before the outer panel is installed and after all necessary components are replaced or adjusted. Special care should be taken in measuring around the magnetron.

WARNING

Avoid contacting any high voltage parts.

(2) Measurements with a fully assembled oven.

After all components, including outer panel are fully assembled, measure for radiation leakage around the door periphery, the door viewing window, the exhaust opening and air inlet openings.

3. Record keeping and notification after measurement

(A) After any adjustment or repair to a microwave oven, a leakage reading must be taken. Record this leakage reading on the repair ticket even if it is zero.

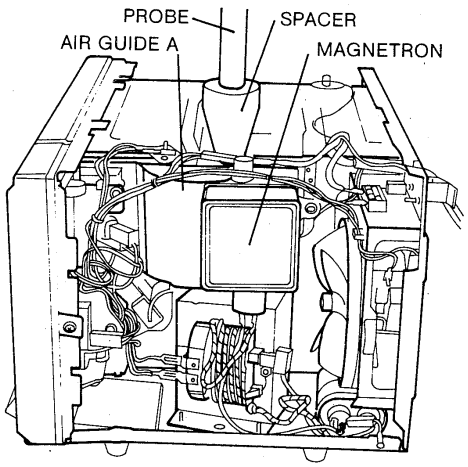
A copy of this repair ticket and the microwave leakage reading should be kept by repair facility.

(B) Should the radiation leakage be more than 2 mW/cm² (1mW/cm² for Canada) after determining that all parts are in good condition, functioning properly, and genuine replacement parts as listed in this manual have been used, immediately notify PASC, PSC or PCI.

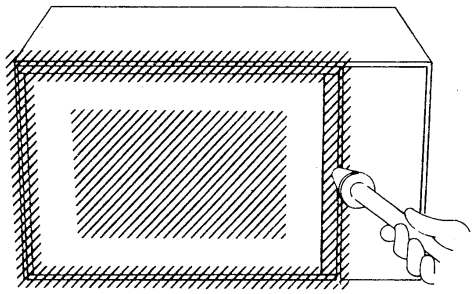
4. At least once a year, have the radiation monitor checked for calibration by its manufacturer.

WARNING

AVOID CONTACTING ANY HIGH VOLTAGE PARTS.



01-034



01-035

MOVE PROBE ALONG SHADED AREA (////) AROUND EXHAUST OPENINGS (as shown) AND AROUND AIR INLET OPENING

TROUBLESHOOTING GUIDE

CAUTION

1. Check grounding before checking for trouble.
2. Be careful of the high voltage circuit.
3. Discharge high voltage capacitor.
4. When checking the continuity of the switches or the high voltage transformer, disconnect one lead wire from these parts and then check continuity with the AC plug removed. To do otherwise may result in a false reading or damage to your meter.
   When disconnecting a plastic connector from a terminal, you must hold the plastic connector instead of the lead wire and then disconnect it, otherwise lead wire may be open or the connector cannot be removed.
5. Do not touch any parts of the circuitry on the digital programmer circuit, since static electric discharge may damage this control panel.
   Always touch yourself to ground while working on this panel to discharge any static charge in your body.
6. 120V AC is present at the shaded area ▭ of the digital programmer circuit (Terminals of power relay's and primary circuit of low voltage transformer). When troubleshooting, be cautious of possible electrical shock hazard.

First of all operate the microwave oven following the correct operating procedures in order to find the exact cause of any trouble.

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven is dead. Fuse is OK. No display and no operation at all.	1. Open or loose lead wire harness. 2. Open thermal cutout (Magnetron) 3. Open low voltage transformer 4. Defective DPC	Check fan motor when thermal cutout is defective.
2.	No display and no operation at all. Fuse is blown.	1. Shorted lead wire harness 2. Defective primary latch switch (NOTE 1) 3. Defective short switch (NOTE 1) 4. Shorted H.V. Capacitor 5. Shorted H.V. Transformer (NOTE 2)	Check adjustment of primary, secondary latch switch and short switch including door.
		NOTE 1: All of these switches must be replaced at the same time. (Refer to adjustment instructions.) Check continuity of power relay B's contacts (between 1 and 2) and if it has continuity, replace power relay B also. NOTE 2: When H.V. Transformer is replaced, check diode and magnetron also.	
3.	Oven does not accept key input (Program).	1. Key input is not in sequence 2. Open or loose connection of membrane key pad to DPC (Flat cable) 3. Shorted or open membrane key board 4. Defective DPC	Refer to operation procedure. Refer to DPC troubleshooting.
4.	Oven lamp and fan motor turn on when oven is plugged in with door closed.	1. Misadjustment or loose wiring of secondary latch switch 2. Defective secondary latch switch	Adjust door and latch switches.
5.	Timer starts countdown but no microwave oscillation. (No heat while oven lamp and fan motor turn on)	1. Off-alignment of latch switches 2. Open or loose connection of high voltage circuit especially magnetron filament circuit NOTE: Large contact resistance will bring lower magnetron filament voltage and cause magnetron to lower output and/or have intermittent oscillation 3. Defective high voltage component H.V. Transformer H.V. Capacitor H.V. Diode Magnetron 4. Open or loose wiring of power relay B 5. Defective primary latch switch 6. Defective power relay B or DPC	Adjust door and latch switches. Check high voltage component according to component test procedure and replace if it is defective. Refer to DPC troubleshooting

	SYMPTOM	CAUSE	CORRECTIONS
6.	Oven can program but timer does not start countdown.	1. Open or loose wiring of secondary latch switch 2. Off-alignment of secondary latch switch 3. Defective secondary latch switch	Adjust door and latch switches.
7.	Microwave output is low. Oven takes longer time to cook food.	1. Decrease in power source voltage 2. Open or loose wiring of magnetron filament circuit. (Intermittent oscillation) 3. Aging change of magnetron	Consult electrician
8.	Fan motor and oven lamp turn on when door is opened.	1. Shorted primary latch switch	Need.
9.	Oven does not operate and return to plugged in mode.	1. Open or loose wiring of temp sensor 2. Defective temp sensor 3. Defective DPC	Check tighten screws on escutcheon base bracket, D.P.C. board and temp sensor.
10.	Loud buzzing noise can be heard.	1. Loose fan and fan motor 2. Loose screws on H.V. Transformer 3. Shorted H.V. Diode	
11.	Turntable motor does not rotate.	1. Open or loose wiring of turntable motor 2. Defective turntable motor	
12.	Oven stops operation during cooking.	1. Open or loose wiring of primary and secondary latch switch 2. Operation of thermal cutout (Magnetron)	Adjust door and latch switches.

Trouble related to Digital Programmer Circuit

SYMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
No display when oven is first plugged in. Oven is dead.	1	Fuse pattern of DPC	Normal	STEP 2
			Open (NOTE)	Shorted Circuit of ZNR, L.V.T., Oven Lamp etc. Replace DPC
	2	Low voltage transformer (LVT) secondary voltage	Abnormal 0V	LVT
			Normal	→ Step 3
	3	IC-1 pin 22 voltage (Emitter of Q1)	Abnormal	ZD1, Q1
			Normal = 5V	→ Step 4
	4	IC-1 pin 27 voltage (14 pin of IC-2)	Abnormal	IC-2
			Normal	→ IC-1, CX1

NOTE

Procedure of fuse pattern repairing is as follows:

1. When the fuse pattern (PF2) opens.

(1) Remove the jumper wire (PF1).

(2) Insert the removed jumper wire (PF1) to "(PF2)" position and solder it. If both "PF1" and "PF2" fuse patterns are open, please replace DPC.

2. When the fuse pattern (PF4) opens.

(1) Remove the jumper wire (PF3).

(2) Insert the removed jumper wire (PF3) to "(PF4)" position and solder it. If both "PF1" and "PF2" fuse patterns are open, please replace DPC.

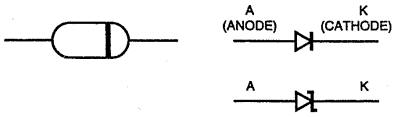
NOTE:* At the time of these repairs, make visual inspection of the varistor for burning damage and examine the transformer with tester for the presence of layer short-circuit (check primary coil resistance).
If any abnormal condition is detected, replace the defective parts.

Trouble related to Digital Programmer Circuit

SYMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
No key input	1	Membrane switch continuity	Abnormal	Membrane switch
			Normal	IC-1
No beep sound	1	IC-1 pin 11 voltage	Abnormal	IC-1
			Normal	BZ, Q2
Power relay A(RY-2) does not turn on even though the program has been set and the start pad is tapped	1	IC-1 pin 10 voltage while operation	Abnormal	IC-1,
			Normal = 5V	→ Step 2
	2	short circuit between pin 1 and pin 12 of IC-2	Still not turn on	RY-2
			RY-2 turns on	IC-2
No microwave oscillation at any power setting	1	IC-1 pin 8 and pin 9 voltages while operation at high power	Abnormal	IC-1
			Normal 8---5V, 9---5V	→ Step 2
	2	Q8 translator	Abnormal	Q8
			Normal	IC-2, RY-1
Oven function is OK but no display all digits.	1	IC-3 pin 9 voltage	Abnormal	C11, D11-D14, LVT
			Normal = 9-10V	→ Step 2
	2	Replace display and check operation	Normal	Display
			Still no display	IC-1, IC-3

HOW TO CHECK THE SEMICONDUCTORS USING AN OHM METER

Diode



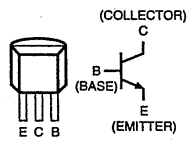
	FORWARD	REVERSE
A-K	SMALL	∞

Transistor

NPN Transistor

2SC·····

2SD·····

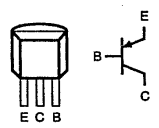


	FORWARD	REVERSE
B-E	SMALL	∞
B-C	SMALL	∞
C-E	∞	∞

PNP Transistor

2SA·····

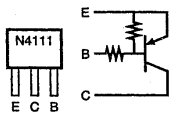
2SB·····



	FORWARD	REVERSE
E-B	SMALL	∞
C-B	SMALL	∞
C-E	∞	∞

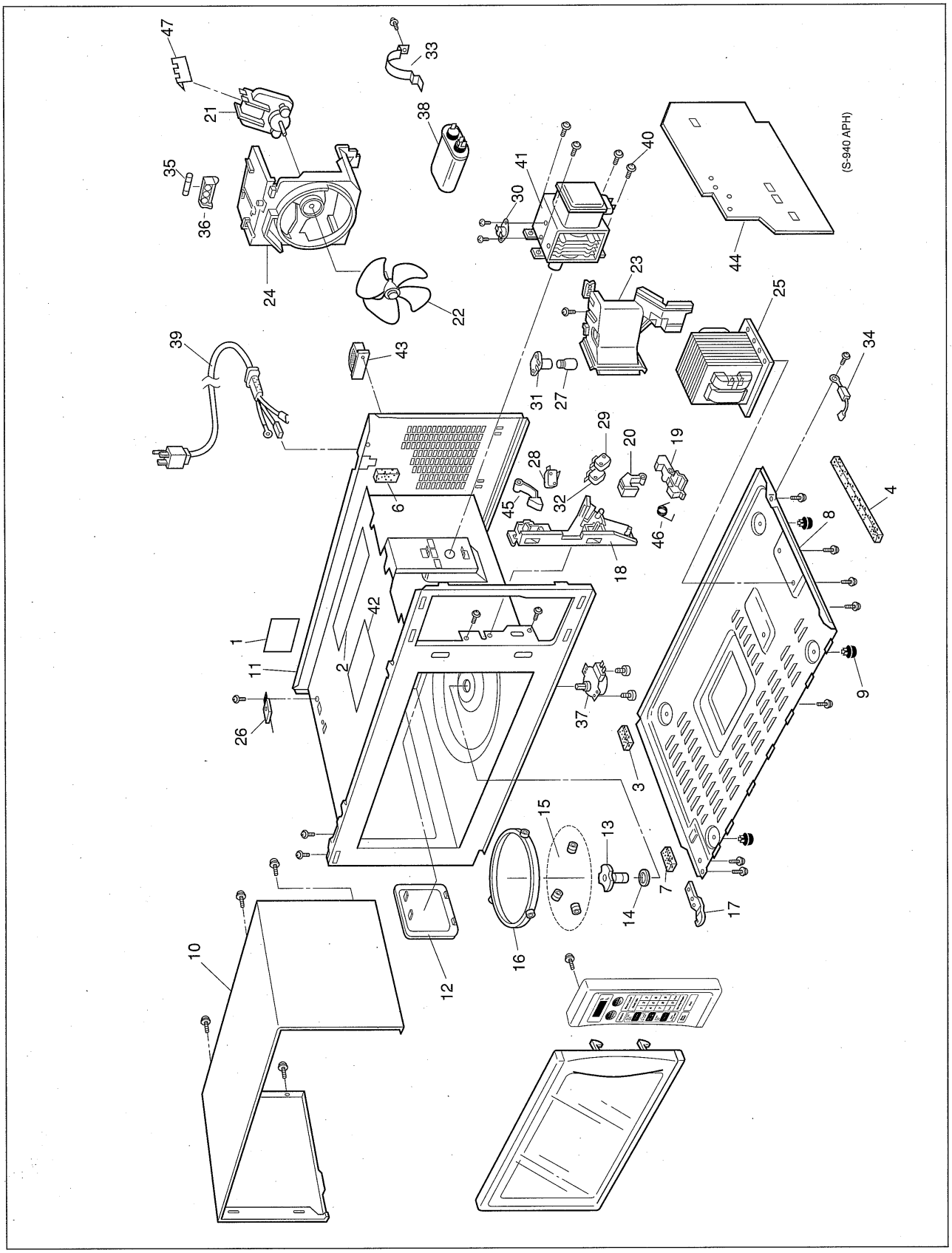
Digital Transistor

PNP Transistor



	FORWARD	REVERSE
E-B	10kΩ~30kΩ	10kΩ~30kΩ
C-B	50kΩ~90kΩ	∞
C-E	40kΩ~80kΩ	∞

EXPLODED VIEW AND PARTS LIST



PARTS LIST

NOTES • When ordering replacement part(s), please use part number(s) shown in this parts list.
Do not use description of the part.
• Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
• Items marked * supplied by MMCA. (U.S.A.)

Ref.No.		Part No.	Part Name & Description	Pcs/Set	Remarks
*1		B00066260AP	CAUTION LABEL	1	
*2		B00338290AP	FUSE LABEL	1	
*3		AMQ0902000BA	CUSHION RUBBER A	1	NN-S647BA
*4		AMQ0902000AH	CUSHION RUBBER A	1	
*6		AMQ0902000FD	CUSHION RUBBER A	1	
*7		AMQ0904000BB	CUSHION RUBBER A	1	NN-S647BA
*8		B10018640AP	BASE/1.2	1	NN-S647BA
*8		B10018250AP	BASE/1.0	1	NN-S547BA/WA
*9		B10088250AP	RUBBER FOOT	4	
*10		B10097650AP	CABINET BODY/1.2 - BLACK	1	NN-S647BA
*10		B10097250AP	CABINET BODY/1.0 - BLACK	1	NN-S547BA
*10		B10097250HAP	CABINET BODY/1.0 - WHITE	1	NN-S547WA
*11	⚠	B201A9390AP	OVEN/1.2	1	NN-S647BA
*11	⚠	B200A8340AP	OVEN/1.0	1	NN-S547BA/WA
*12		B20557000AP	CEILING COVER WHITE	1	
*13		B21315540AP	PULLEY SHAFT	1	
*14		B21777050AP	WASHER	1	
*15		B202K4650AP	ROLLER B(U)	1	(NOTE 1)
*16		B290D5500AP	ROLLER RING(U)	1	NN-S647BA
*16		B290D5950AP	ROLLER RING(U)	1	NN-S547BA/WA
*17	⚠	B30077050AP	LOWER HINGE (B)	1	
*18	⚠	B3020-1480	DOOR HOOK A	1	
*19		B3137-1480	HOOK SPACER B	1	
*20		B3136-1480	HOOK SPACER C	1	
*21		2Z-9D0A.S.	FAN MOTOR	1	(120V, 24W, AC, SINGLE PHASE)
*22		B40085950AP	FAN BLADE	1	
*23		B40259390AP	AIR GUIDE A	1	
*24		B41447630AP	ORIFICE/1.2	1	NN-S647BA
*24		B41448250AP	ORIFICE/1.0	1	NN-S547BA/WA
*25	⚠	B600B9460AP	H.V. TRANSFORMER	1	(1.5KVA)
*26		A601L5180AP	TEMP SENSOR	1	
*27		B60307080AP	INCANDESCENT LAMP	1	NN-S647BA
*27		B60304740AQ	INCANDESCENT LAMP	1	NN-S547BA/WA
*28	⚠	ANE6142-1450	MICROSWITCH	1	(V-16G-3C26-M) PRIMARY LATCH SWITCH
*29	⚠	A61425180AP	MICROSWITCH	1	(L-3C2-2) SECONDARY LATCH SWITCH
*30	⚠	B61456210AP	THERMAL CUTOUT	1	
*31	⚠	B61529390AP	SOCKET	1	
*32	⚠	A61785180AP	MICRO SWITCH	1	(L-2C2-2)SHORT SWITCH
*33		B61884060AP	CAPACITOR BRACKET	1	
*34	⚠	B62024000AP	DIODE,SI	1	
*35	⚠	B62308250AP	FUSE	1	(18A)
*36		B62314000AP	FUSE HOLDER	1	
*37		B63264080AP	TURNTABLE MOTOR	1	(3W)
*38	⚠	B63907050AP	H.V. CAPACITOR	1	(1.0μf, AC2100V)
*39	⚠	B900C8250AP	AC CORD W/PLUG	1	NN-S547BA/WA (120V)
*39	⚠	B900C7630AQ	AC CORD W/PLUG	1	NN-S647BA (120V)
*40		XTT4+8B	SCREW	4	(4X8) FOR MAGNETRON
*41	⚠	2M189B-M1F1	MAGNETRON	1	
*42		B03478250AP	COVER SHEET	1	NN-S547BA/WA
*43		B11408760AP	STOPPER A	1	
*44		B10179390AP	INSULATOR COVER	1	

Ref.No.		Part No.	Part Name & Description	Pcs/Set	Remarks
*45		B3136-1480	HOOK SPACER A	1	
*46		J3097-1480	LATCH SPRING	1	
*47		B10179330AP	FAN MOTOR INSULATOR	1	
*		B08878640AP	CABINET BODY TOUCH-UP PAINT (BLACK)	1	BOTTLE WITH BRUSH, FOR REPAIR OF PAINTED CABINET BODY
*		B08878640HAP	CABINET BODY TOUCH-UP PAINT (WHITE)	1	BOTTLE WITH BRUSH, FOR REPAIR OF PAINTED CABINET BODY
*		B08877050AP	CAVITY SPRAY PAINT/1.2	1	SPRAY CAN, FOR REPAIR OF PAINTED OVEN CAVITY
*		B08877000AP	TOUCH-UP PAINT/1.2	1	BOTTLE WITH BRUSH, FOR REPAIR OF PAINTED OVEN CAVITY
*		B0887705AAP	CAVITY SPRAY PAINT/1.0	1	SPRAY CAN, FOR REPAIR OF PAINTED OVEN CAVITY
*		B0887700AAP	TOUCH-UP PAINT/1.0	1	BOTTLE WITH BRUSH, FOR REPAIR OF PAINTED OVEN CAVITY

NOTE 1: When ordering the roller B assy, three rollers will be shipped.
When replacing the roller B, three rollers should be replaced at the same time.
Otherwise the glass cooking tray may not turn smoothly.

SERVICE FIXTURES AND TOOLS

EXTENSION CABLES

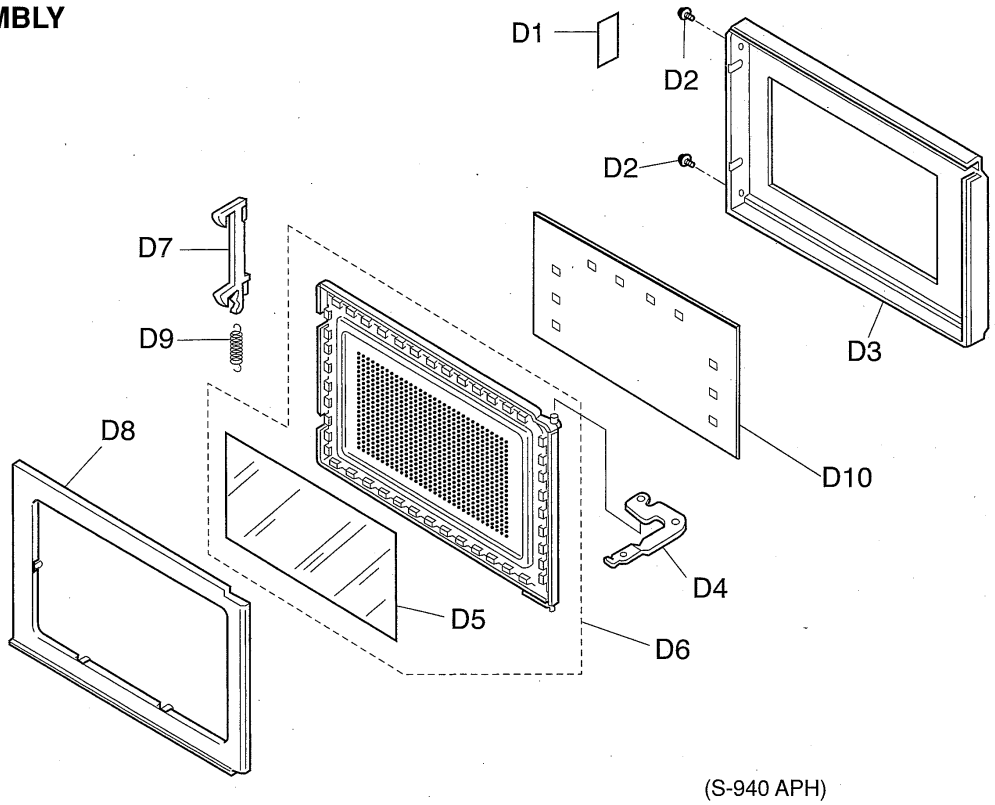
NOTE: To be used when repairing the DPC board assembly directly on the oven for easy access of the board.

DPC COMMON CHECKER AND ITS CABLE

NOTE: To be used only when DPC common checker is available

Ref.No.		Part No.	Part Name & Description	Pcs/Set	Remarks
		AT40P004	4 pin Extension Cable	1	Cable No. 47
		AT40P005	5 pin Extension Cable	1	Cable No. 46
		AT40E006	1 pinX6 Extension Cable	1	Cable No. 9
		ANE600ZK70AP	DPC. Common Checker	1	
		AT30A7020AP	DPC. Checker Cable	1	NOTE

DOOR ASSEMBLY

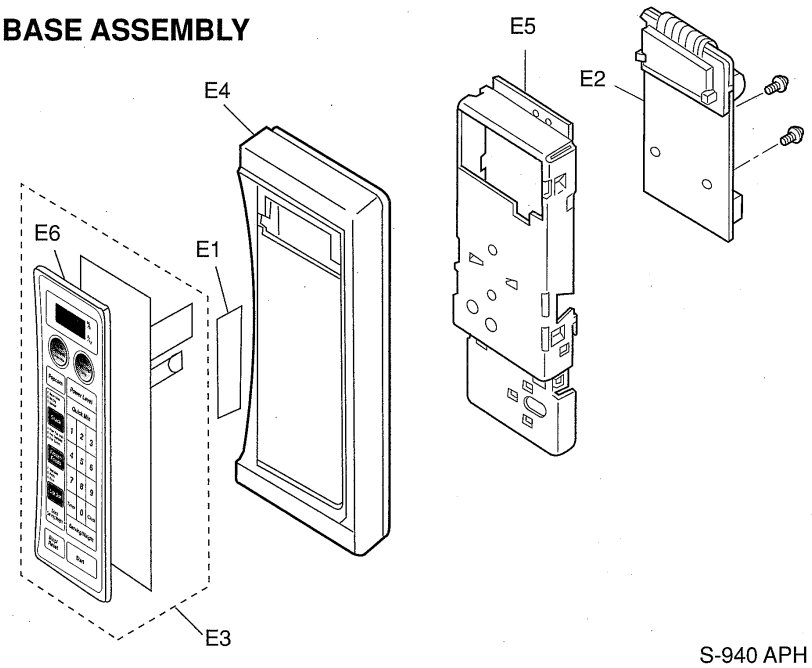


(S-940 APH)

Ref.No.		Part No.	Part Name & Description	Pcs/Set	Remarks
*D1		B02454180AP	DHHS LABEL	1	
*D2		XTBANE3+8BZ	SCREW	2	
*D3	⚠	B301A8670AP	DOOR A (U)/1.2 - BLACK	1	NN-S647BA (NOTE 2)
*D3	⚠	B301A8360AP	DOOR A (U)/1.0 - BLACK	1	NN-S547BA (NOTE 2)
*D3	⚠	B301A9500HAP	DOOR A (U)/1.0 - WHITE	1	NN-S547WA (NOTE 2)
*D4	⚠	B30067050AP	UPPER HINGE (A)	1	
*D5	⚠	B31457050AP	DOOR SCREEN A/1.2	1	NN-S647BA
*D5	⚠	B31457200AP	DOOR SCREEN A/1.0	1	NN-S547BA/WA
*D6	⚠	B302K8660AP	DOOR E(U)/1.2 - BLACK	1	NN-S647BA
*D6	⚠	B302K8340AP	DOOR E(U)/1.0 - BLACK	1	NN-S547BA
*D6	⚠	B302K8340HAP	DOOR E(U)/1.0 - WHITE	1	NN-S547WA
*D7		B3018-1480	DOOR KEY	1	
*D8	⚠	B30858640AP	DOOR C/1.2 - BLACK	1	NN-S647BA
*D8	⚠	B30858340AP	DOOR C/1.0 - BLACK	1	NN-S547BA
*D8	⚠	B30858340HAP	DOOR C/1.0 - WHITE	1	NN-S547WA
*D9		B30214000AP	DOOR KEY SPRING	1	
*D10	⚠	B31469410HAP	DOOR SCREEN B/1.0	1	NN-S547WA

NOTE 2: Please order Door A and DHHS Label together

ESCUTCHEON BASE ASSEMBLY

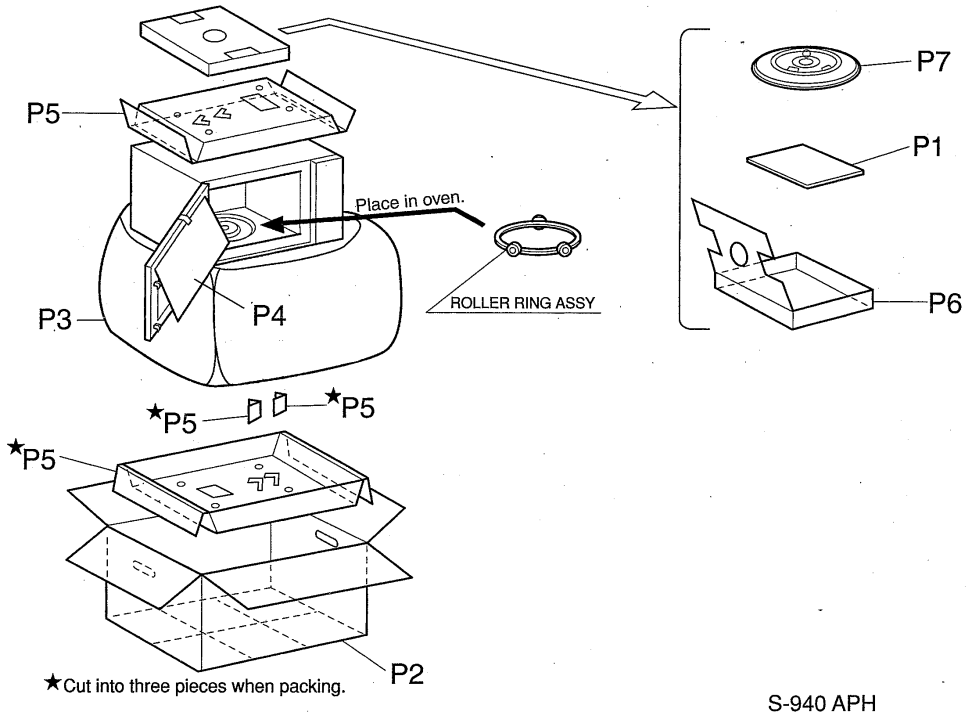


S-940 APH

Ref.No.		Part No.	Part Name & Description	Pcs/Set	Remarks
*E1		B00079400AP	NAME PLATE	1	NN-S647BA
*E1		B00079500HAP	NAME PLATE	1	NN-S547WA
*E1		B00079500AP	NAME PLATE	1	NN-S547BA
*E2		B603L9400AP	D.P.CIRCUIT (U)	1	NN-S647BA RTL (W/COMPONENTS)
*E2		B603L9500AP	D.P.CIRCUIT (U)	1	NN-S547BA/WA RTL (W/COMPONENTS)
*E3		B630Y9400AP	MEMBRANE SWITCH (U)	1	NN-S647BA (W/ESCUTCHEON SHEET)
*E3		B630Y9500HAP	MEMBRANE SWITCH (U)	1	NN-S547WA (W/ESCUTCHEON SHEET)
*E3		B630Y9500AP	MEMBRANE SWITCH (U)	1	NN-S547BA (W/ESCUTCHEON SHEET)
*E4		B80348660AP	ESCUTCHEON BASE	1	NN-S647BA, NN-S547BA (NOTE 3)
*E4		B80348660HAP	ESCUTCHEON BASE	1	NN-S547WA (NOTE 3)
*E5		B81278640AP	BACK PLATE	1	
*E6		B83379500AP	ESCUTCHEON SHEET	1	NN-S647BA, NN-S547BA
*E6		B83379500HAP	ESCUTCHEON SHEET	1	NN-S547WA

NOTE 3: Please order Escutcheon Base and Name Plate together.

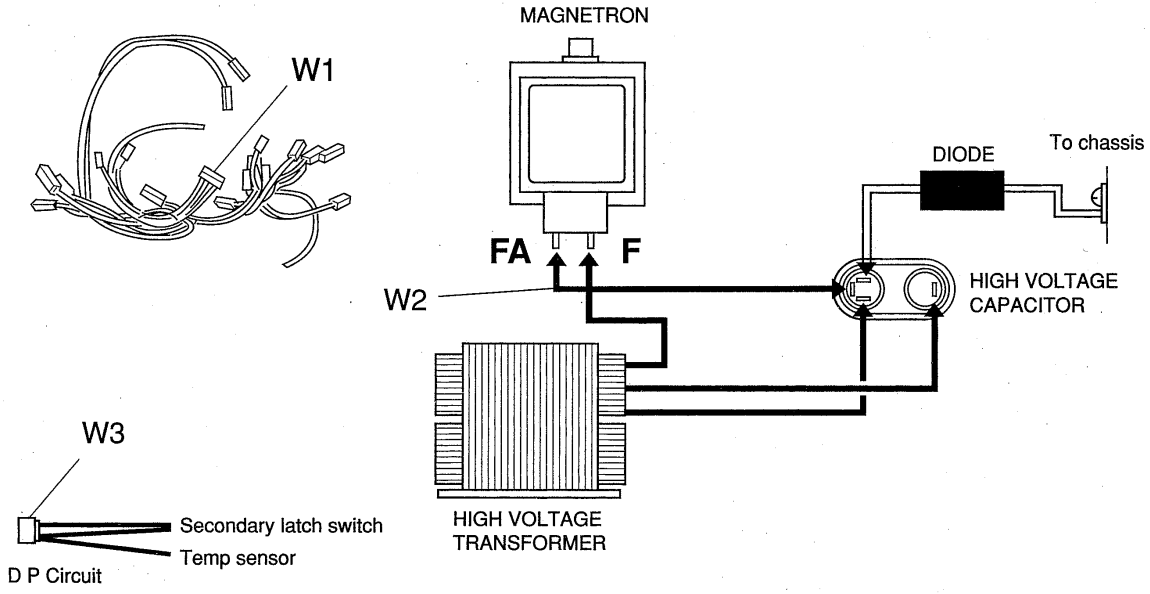
PACKING AND ACCESSORIES



S-940 APH

Ref.No.		Part No.	Part Name & Description	Pcs/Set	Remarks
*P1		B00039500AP	INSTRUCTION BOOK	1	
*P2		B010A7730AP	PACKING CASE/PAPER	1	NN-S547BA/WA
*P2		B010A9390AP	PACKING CASE/PAPER	1	NN-S647BA
*P3		B01068290AP	P.E. BAG	1	NN-S647BA
*P3		B01068340AP	P.E. BAG	1	NN-S547BA/WA
*P4		B01075640AP	DOOR SHEET	1	
*P5		B01837050AP	CORRUGATED PACKING	2	NN-S647BA
*P5		B01837220AP	CORRUGATED PACKING	2	NN-S547BA/WA
*P6		B02218310AP	UPPER SUPPORT PACKING	1	NN-S647BA
*P6		B02218260AP	UPPER SUPPORT PACKING	1	NN-S547BA/WA
*P7		A06014000AP	COOKING TRAY	1	NN-S647BA
*P7		A06015690QP	COOKING TRAY	1	NN-S547BA/WA

WIRING MATERIALS



S-940 APH

Ref.No.		Part No.	Part Name & Description	Pcs/Set	Remarks
*W1		B030A9390AP	LEAD WIRE HARNESS	1	
*W2		B03508640AP	LEAD WIRE	1	
*W3		B03537050AP	LEAD WIRE	1	

DIGITAL PROGRAMMER CIRCUIT

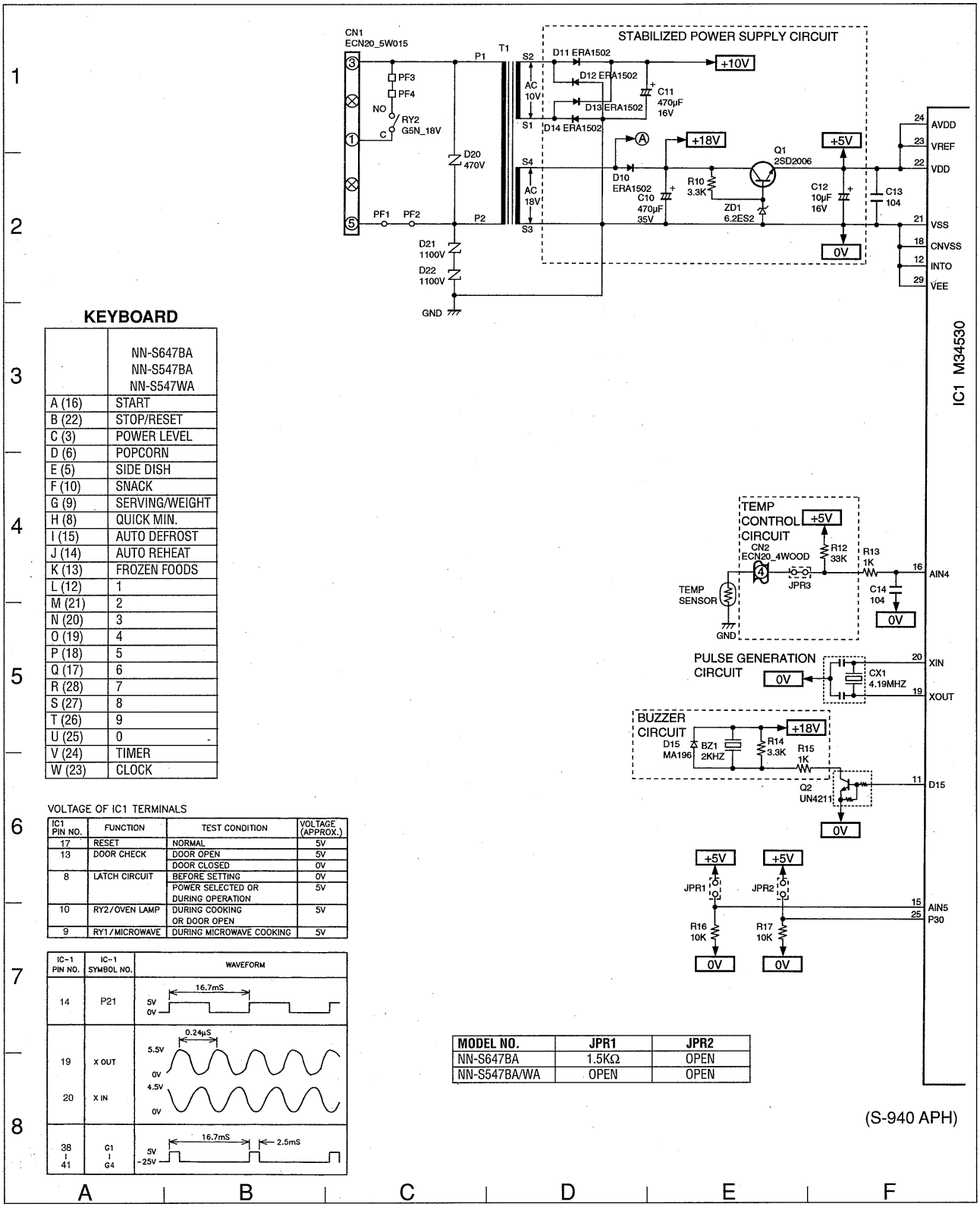
PARTS LIST

Note: Items marked * are supplied by MMCA (U.S.A.)

REF No.	MMCA CODE	DESCRIPTION	QTY	REMARKS
BZ1	AEFB22EP20TL	BUZZER	1	2.0KHz
C10	ECEA1VU471E	ELECTROLYTIC CAPACITOR, AL.	1	470µF/35V
C11	ECEA1CU471B	ELECTROLYTIC CAPACITOR, AL.	1	470µF/16V
C12	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	1	10µF/16V
C13, C14, C15, C17	AECF50F104Z	CERAMIC CAPACITOR	4	0.1µF/50V
C16, C18, C19, C21, C22, C23	AECBT50F103Z	CERAMIC CAPACITOR	6	0.01µF/25V
C20	ECEA1HKA2R2B	ELECTROLYTIC CAPACITOR, AL.	1	2.2µF/50V
CN1	AEEMMF01505W	CONNECTOR	1	5PIN
CN2	AEEMMF00D04W	CONNECTOR	1	4PIN
CN3	AEEM09FDZBTM	CONNECTOR	1	9PIN
CX1	EF0GC4194T4	CERAMIC RESONATOR	1	4.19MHz
D10, D11, D12, D13, D14	AEDNERA1502	DIODE, SI	5	(1A)
D15, D16, D17, D18, D19, D23	MA196-(TA5)	DIODE, SI	6	0.1A
D20	ERZC10DK471F	VARISTOR	1	470 v. d.c.
DISP1*, DISP2*	AELNA0414B12	DISPLAY	2	LED
IC1*	AEIC34530069	L.S.I.	1	
IC2*	AN6752	IC	1	
IC3*	AEICKID65004	IC	1	
JPR1	ERD25VJ1R0T	CARBON FILM RESISTOR	1	NN-S647BA 1.5K ohms, 1/4W, ±5%
Q1	2SD2006QRTA	TRANSISTOR, SI, 1.2W	1	120MHz
Q2	UN4211-(TA)	TRANSISTOR, SI	1	
Q3, Q4, Q5, Q6	2SD2259-(TA)	TRANSISTOR, SI	4	
Q7	UN4219-(TA)	TRANSISTOR, SI	1	
Q8	2SD1991AQSTA	TRANSISTOR, SI, 400MW	1	150MHz
R10, R14	ERDS2TJ332T	CARBON FILM RESISTOR	2	3.3K ohms, 1/4W, ±5%
R11, R16, R17, R18, R42	ERDS2TJ103T	CARBON FILM RESISTOR	5	10K ohms, 1/4, ±5%
R12	ERDS2TJ333T	CARBON FILM RESISTOR	1	33K ohms, 1/4W, ±5%
R13, R15	ERDS2TJ102T	CARBON FILM RESISTOR	2	1K ohms, 1/4W, ±5%
R19, R20, R21, R22	ERDS2TJ331T	CARBON FILM RESISTOR	4	330 ohms, 1/4W, ±5%
R40	ERDS2TJ242T	CARBON FILM RESISTOR	1	2.4K ohms, 1/4W, ±5%
R23, R24, R25, R26, R27, R28, R29, R30	ERDS2TJ680T	CARBON FILM RESISTOR	8	68 ohms, 1/4W, ±5%
RY1	AEG5J1EM12B ⚠	POWER RELAY	1	(12V)
RY2	AEBGG5N1A18 ⚠	POWER RELAY	1	(18V)
T1	ETP41KCN41UU ⚠	L.V. TRANSFORMER	1	
ZD1	AEDZ6R2ES2T1	DIODE, SI		

DIGITAL PROGRAMMER CIRCUIT (NN-S647BA, NN-S547BA/WA)

SCHEMATIC DIAGRAM



KEYBOARD

	NN-S647BA NN-S547BA NN-S547WA
A (16)	START
B (22)	STOP/RESET
C (3)	POWER LEVEL
D (6)	POPCORN
E (5)	SIDE DISH
F (10)	SNACK
G (9)	SERVING/WEIGHT
H (8)	QUICK MIN.
I (15)	AUTO DEFROST
J (14)	AUTO REHEAT
K (13)	FROZEN FOODS
L (12)	1
M (21)	2
N (20)	3
O (19)	4
P (18)	5
Q (17)	6
R (28)	7
S (27)	8
T (26)	9
U (25)	0
V (24)	TIMER
W (23)	CLOCK

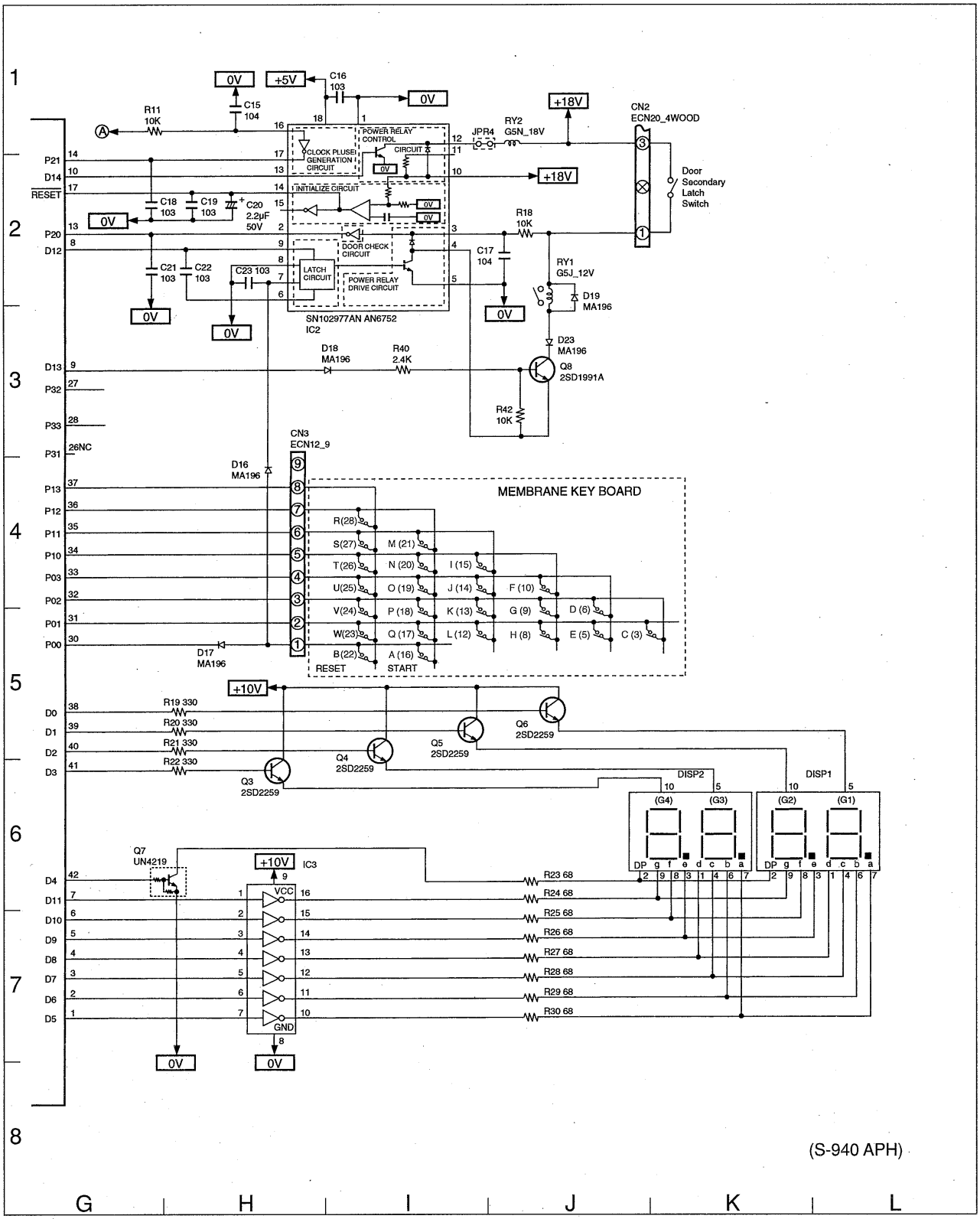
VOLTAGE OF IC1 TERMINALS

IC1 PIN NO.	FUNCTION	TEST CONDITION	VOLTAGE (APPROX.)
17	RESET	NORMAL	5V
13	DOOR CHECK	DOOR OPEN	5V
		DOOR CLOSED	0V
8	LATCH CIRCUIT	BEFORE SETTING	0V
		POWER SELECTED OR DURING OPERATION	5V
10	RY2/OVEN LAMP	DURING COOKING OR DOOR OPEN	5V
9	RY1/MICROWAVE	DURING MICROWAVE COOKING	5V

IC-1 PIN NO.	IC-1 SYMBOL NO.	WAVEFORM
14	P21	16.7mS, 5V, 0V
19	X OUT	0.24μS, 5.5V, 0V
20	X IN	4.5V, 0V
38 I 41	G1 I G4	16.7mS, 2.5mS, 5V, -25V

MODEL NO.	JPR1	JPR2
NN-S647BA	1.5KΩ	OPEN
NN-S547BA/WA	OPEN	OPEN

(S-940 APH)


0V
+5V
C16 103
C15 104
R11 10K
+18V
CN2 ECN20_4WOOD
RY2 G5N_18V
JPR4
POWER RELAY CONTROL
CLOCK PLUSE GENERATION CIRCUIT
CIRCUIT
INITIALIZE CIRCUIT
Door Secondary Latch Switch
C18 103
C19 103
C20 2.2μF 50V
R18 10K
DOOR CHECK CIRCUIT
C17 104
C21 103
C22 103
C23 103
LATCH CIRCUIT
POWER RELAY DRIVE CIRCUIT
RY1 G5J_12V
D19 MA196
SN102977AN AN6752
IC2
D18 MA196
R40 2.4K
D23 MA196
Q8 2SD1991A
R42 10K
CN3 ECN12_9
D16 MA196
D17 MA196
MEMBRANE KEY BOARD
R(28)
S(27)
M (21)
T(26)
N (20)
I (15)
U(25)
O (19)
J (14)
F (10)
V(24)
P (18)
K (13)
G (9)
D (6)
W(23)
Q (17)
L (12)
H (8)
E (5)
C (3)
B(22) RESET
A (16) START
+10V
R19 330
R20 330
R21 330
R22 330
Q3 2SD2259
Q4 2SD2259
Q5 2SD2259
Q6 2SD2259
DISP2
DISP1
(G4)
(G3)
(G2)
(G1)
DP g f e d c b a
Q7 UN4219
IC3
VCC
GND
R23 68
R24 68
R25 68
R26 68
R27 68
R28 68
R29 68
R30 68
P21
D14
RESET
P20
D12
D13
P32
P33
P31
26NC
P13
P12
P11
P10
P03
P02
P01
P00
D0
D1
D2
D3
D4
D11
D10
D9
D8
D7
D6
D5
(S-940 APH)